2011

The Four Hundred and Ninety-Second Report of the Curricular Affairs Committee.

University of Rhode Island Faculty Senate

THE
UNIVERSITY
OF RHODE ISLAND

THINK BIG WE DO

Serial Number #11-12--6

TO: President David Dooley

FROM: Nancy Eaton, Chairperson of the Faculty Senate

1. The attached BILL titled, The Four Hundred and Ninety-Second Report of the Curricular Affairs Committee, is forwarded for your consideration.

2. This BILL was adopted by vote of the Faculty Senate on December 15, 2011.

3. After considering this bill, will you please indicate your approval or disapproval. Return the original or forward it to the Board of Governors, completing the appropriate endorsement below.

4. In accordance with Section 10, paragraph 4 of the Senate's By-Laws, this bill will become effective January 5, 2012, three weeks after Senate approval, unless: (1) specific dates for implementation are written into the bill; (2) you return it disapproved; (3) you forward it to the Board of Governors for their approval; or (4) the University Faculty petitions for a referendum. If the bill is forwarded to the Board of Governors, it will not become effective until approved by the Board.

December 16, 2011
(date)

Nancy Eaton
Chairperson of the Faculty Senate

ENDORSEMENT

TO: Chairperson of the Faculty Senate

FROM: President of the University

Returned.

a. Approved ✓.

b. Approved subject to final approval by Board of Governors ✓. Approved 6/25/12

c. Disapproved ___.

2.1.12
(date)

President

Form revised 1/10

THE
UNIVERSITY
OF RHODE ISLAND
FACULTY SENATE

THINK BIG WE DO

December 5, 2011

Faculty Senate Curricular Affairs Committee
Four Hundred Ninety-Second Report

At the November 21, 2011 meeting of the Curricular Affairs Committee and by electronic communication, the following matters were considered and are now presented to the Faculty Senate.

SECTION I

Informational Matters

A. College of Arts and Sciences

Department of Art and Art History

ADD: **ART 214X Photography I - Digital (3)**
Introduction to basic digital photography and editing. Emphasis on photography as an artistic medium. Required projects and readings. (Studio)

B. College of Arts and Sciences and Providence Campus

ADD: The B. A. degree in Film Media as a degree offered on the Providence Campus in accordance with section 8.88.10 of the UNIVERSITY MANUAL*.

C. College of Engineering

Department of Civil and Environmental Engineering

a. CHANGE: Prerequisite for CVE 354 to "Pre: 220 with C or better and at least a 2.00 (C) average in MTH 141, MTH 142, PHY 203, PHY 204, and CHM101."

b. CHANGE: Description for CVE 381 to: "Engineering properties of soils, seepage, consolidation theory, calculation of stresses, failure theories, shear strength of sand, shear strength of clay."

c. CHANGE: Description for CVE 382 to "Laboratory studies of physical properties and behavior of soils: index properties, compaction, consolidation, and shear strength. Interpretation, evaluation, and engineering applications of test data."

*8.88.10 Degree Programs on the Providence Campus. Departments planning to offer existing degree programs at the Providence Campus must develop and approve a plan for offering and staffing courses and advising students. Once approved by the academic department, this plan should be forwarded simultaneously to the appropriate college curriculum committee and to the Vice Provost for Urban Programs for review and approval and then undergraduate programs shall be forwarded to the Curricular Affairs Committee and graduate programs to the Graduate Council for approval. Actions taken by the Curricular Affairs Committee and Graduate Council shall be reported to the Faculty Senate for information.

D. Online Instruction (in consultation with the UCGE Committee):

BCH 190 Issues in Biotechnology (Kausch)
This General Education course is in the Natural Sciences (N) core area with the following skills: using qualitative data, using quantitative data, reading complex texts, may be offered online.

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SECTION II

Curricular Matters Which Require Confirmation by the Faculty Senate

A. College of Arts and Sciences

1. African and African American Studies Program

*CHANGE: Name of program to Africana Studies."

2. Department of Communication Studies and Department of Journalism

CHANGE: Requirements for the B. A. in Public Relations by requiring JOR 220 for the major instead of as a prerequisite for admission to the program. This changes the number of credits required for the degree from 33 to 36.

3. Women's Studies Program

*CHANGE: Name of program, B.A. degree, and minor to "Gender and Women's Studies."

B. College of Engineering

Department of Civil and Environmental Engineering

DELETE: The following courses:

1) **CVE 240 Geomatics (2)**

2) **CVE 241 Geomatics Laboratory (1)**

C. College of the Environment and Life Sciences

1. Department of Cell and Molecular Biology

*CHANGE: Name of degree program to "Cell and Molecular Biology"

*ADD: A new track in "Biochemistry" under the Cell and Molecular Biology degree (see Appendix A).

2. Department of Fisheries, Animal and Veterinary Science

*May be subject to review/approval by the RI Board of Governors for Higher Education.

*CHANGE: Requirements for the three options in Animal Science and Technology as follows:

ANIMAL SCIENCE AND TECHNOLOGY

This major, offered by the Department of Fisheries, Animal and Veterinary Science, is designed for students interested in applied animal science careers. Options are available to students interested in veterinary medicine, animal sciences, and animal management. The major requires AVS 101,102, 110, 331 and 333 plus option-specific courses as indicated below. Also required are 19-48 credits in basic science, 25-26 credits of concentration courses, and 8-35 credits of supporting electives approved for the major.

Animal Science Option. This option includes animal nutrition, physiology, behavior, and disease. Students will normally emphasize one or more of these areas. A strong preparatory background in the basic sciences is needed. Students in this option seek employment in technical areas and/or continue their studies in specialized graduate programs.
In addition to the requirements of the major, students choosing this option must complete the following basic science requirements: AVS 420 or BIO 352; BIO 101, 102; CHM 101, 102, 112, 114; CHM 124, 126 or CHM 226, 227, 228; MIC 201or 211; and MTH 131 and STA 307 or 308. The remaining credit requirements will be selected from the concentration courses and supporting electives approved for this option.

Animal Management Option. Research techniques and procedures for animal care are emphasized along with a strong background in the sciences. Students with this training and animal experience would be employed in research and teaching facilities as animal technicians, animal technologists, supervisors of animal technicians, and assistant research project leaders.
In addition to the requirements of the major, students must complete the following basic science requirements: BIO 101; CHM 101, 102, 112, 114 or CHM 103, 105, 124, 126; MTH 107 or higher. Twelve credits in animal management are required in the concentration. The remaining credits will be selected from the concentration courses and supporting electives approved for this option.

Preveterinary Option. This option requires a demonstrated capability in the basic sciences and prepares students for admission to veterinary schools offering the D.V.M. degree. Because admission requirements among schools are not totally uniform and are subject to change, students should determine

specific requirements of the schools in which they are interested. Those who are not accepted for veterinary training will be well prepared to pursue graduate programs in animal physiology and health.
In addition to the requirements of the major, students must complete the following basic science requirements: BIO 352; BIO 101, 102; CHM 101, 102, 112, 114, 226, 227, 228; BCH 311; MIC 201 or MIC 211; PHY 111, 112, 185, 186; MTH 131 and STA 307 or STA 308 or 409. The remaining credits will be selected from the concentration courses and supporting electives approved for this option.
(See Appendix B for curriculum worksheets.)

D. College of Human Science and Services

School of Education

ADD: The following new courses:

1) **EDC 331 Clinical Experiences for Secondary Education (1)**
Student applies content learned in the measurement course (371) and prior course work in classroom settings. Pre: 312 or 512 and concurrent enrollment in 371. Open only to students accepted into the School of Education or permission of instructor.

2) **EDC 332 Clinical Experiences for Secondary Education II (1)**
Student applies content learned in 448 and 402 and prior course work in classroom settings. Pre: 371, 331, and concurrent enrollment in 448 and 402. Open only to students accepted into the School of Education or permission of instructor.

E. College of Pharmacy

1. ADD: **PHC 316 Integrated Pharmacy Lab I (1)**
Medications for use in cardiovascular and renal disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab 3) Pre: successful completion of BPS 318, or permission of instructor. Concurrent enrollment in BPS 310 (or PHP 310), BPS 334, and PHP 332 is required.

2. DELETE: **BPS 326 Pharmacology and Medicinal Chemistry Laboratory I (1)**

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*May be subject to review/approval by the RI Board of Governors for Higher Education.

SECTION III

Joint Report of the Curricular Affairs Committee and the Graduate Council on 400-Level Courses and Courses for the Doctor of Pharmacy Degree

At the Curricular Affairs Committee's Meetings of October 24 and November 21, 2011 and the Graduate Council's Meeting of November 21, 2011 the following matters were considered and are now presented to the Faculty Senate.

A. Informational Matters

1. College of Arts and Sciences

   a. African and African American Studies Program and Department of Political Science

      *CHANGE: Description for AAF 408 (or PSC 408) to "Political developments in the nations of Africa. Main stress is thematic: challenges to democracy, ethnicity and identity politics, African political thought, civil conflict, resources, and common developmental problems.

   b. Department of Computer Science and Statistics

      CHANGE: Title for CSC 440 to "**Design and Analysis of Algorithms.**"

   c. Department of Political Science and Women's Studies Program

      *ADD: **PSC 441X (or WMS 441X) Women & Politics (4)** Explores the role of women in the American political system, as voters, campaign activists, and office holders, and as members of organized groups in the policy making process. (Seminar 3, Project 1) Pre: PSC 113 or 210 or 310 or permission of instructor.

*2. Online Instruction

   CHE **473 (or MCE 473) Nuclear Fuel Cycle and Performance** (Knickle) may be offered online.

B. Curricular Matters Which Require Confirmation by the Faculty Senate

1. College of Human Science and Services

   School of Education

      CHANGE: Credits, description, method of instruction and prerequisite for the following courses:

*No action by the Graduate Council. Not for graduate credit.

a) **EDC 400 Middle School Curriculum, Assessment, and Methods (3)**
Seminar addressing contemporary middle school curriculum, assessment, methods and research-based models are emphasized. Focus is on adolescents; teaming; thematic, integrated, interdisciplinary standards-based instruction; differentiated instruction; and multiple intelligences. Pre: 312 or 512, and concurrent enrollment in 371 and 331 for secondary education students; 312 or 512 and concurrent enrollment in 453, 454, and 331 for elementary education students. Open only to students accepted into the School of Education or by permission of instructor.

b) **EDC 415 Adolescents and Classroom Management (3)**
Seminar addressing issues of adolescent development manifested in the classroom emphasizing management strategies for learning and adolescent developmental needs. Pre: 448, 402, 332, and concurrent enrollment in 430 and 431 for secondary education students; concurrent enrollment in 460 for elementary education students. Open only to students accepted into the School of Education or by permission of instructor.

2. College of Pharmacy

*a. DELETE: **BPS 416 Pharmacology and Medicinal Chemistry Laboratory II (1)**

*b. ADD: The following new courses:

1) **PHC 415 Integrated Pharmacy Lab II (1)**
Medications for use in infectious and pulmonary disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab 3) Pre: successful completion of 316 with a grade of C- or better, or permission of instructor. Concurrent enrollment in PHP409 (or BPS 409), BPS 421, and PHP 413 is required.

2) **PHC 416 Integrated Pharmacy Lab III (1)**
Medications for use in central nervous system and psychiatric disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling.(Lab 3) Pre: successful completion of PHC 415 with a grade of C- or better, or permission of instructor. Concurrent enrollment in PHP 412 (or BPS 412), BPS 432,and PHP 424 is required.

*No action by the Graduate Council. Not for graduate credit.

3) **PHC 515 Integrated Pharmacy Lab IV (2)**
Medications for use in gastrointestinal and endocrine disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. (Lab 3, Rec. 1) Pre: successful completion of PHC 416 with a grade of C- or better, or permission of instructor. Concurrent enrollment in PHP 410 (or BPS 410), BPS 422, and PHP 414 is required.

4) **PHC 516 Integrated Pharmacy Lab V (2)**
Medications for use in oncologic and hematologic disorders and their actions, including effects on physiologic functions. Simulated practice sessions designed to develop the delivery of pharmaceutical care, physical assessment, use of patient profiles, and patient counseling. Pre: successful completion of 515, or permission of instructor. Concurrent enrollment in PHP 526 (or BPS 526), BPS 521, and PHP 513 is required.

*No action by the Graduate Council. Not for graduate credit.

THE
UNIVERSITY
OF RHODE ISLAND
Abbreviated Proposal RIBGHE

Revised 10-2009

A Proposal for a Reorganization of the Undergraduate Major in Cell and Molecular Biology

A. PROGRAM INFORMATION

1. **Name of institution**
   University of Rhode Island

2. **Name of department, division, school or college**
   Cell and Molecular Biology

3. **Title of proposed program and Classification of Instructional Programs (CIP) code**
   A Biochemistry undergraduate track in the Major of Cell and Molecular Biology (CMB) (CIP 26.0406)

4. **Intended initiation date of program change. Include anticipated date for granting first degrees or certificates, if appropriate.**
   Initiation date: July 2012
   First degree date: May 2013

5. **Intended location of the program**
   The Kingston Campus

6. **Description of institutional review and approval process**

	Approval Date
Department	June 13, 2011
College	
CAC/Graduate Council	
Faculty Senate	
President of the University	

7. **Summary description of proposed program (not to exceed 2 pages)**
   The Department of Cell and Molecular Biology (CMB) at URI is a teaching and research department in several broad disciplines in molecular biosciences: biochemistry, microbiology, molecular biology, molecular genetics, and medical laboratory science. The department is based in both Kingston and at the URI Providence Biotechnology Center. On the Kingston campus, we currently offer a Bachelor of Science (BS) degree in microbiology with tracks in microbiology and biotechnology, and train graduate students in Cell and Molecular Biology as part of the Biological and Environmental Sciences graduate program.
   To better meet educational and economic demands of Rhode Island and the country, and to better utilize faculty resources, the department proposes to rename our current undergraduate Microbiology major as a Cell and Molecular Biology major (CMB). The existing Microbiology and Biotechnology tracks in the Microbiology major will become

tracks in the CMB major with no change in their curricula. We also propose to add a Biochemistry track to the renamed CMB major. The CMB major will offer a new Bachelor of Science degree in Cell and Molecular Biology [CIP 26.0406] with tracks in Microbiology, Biotechnology and Biochemistry.

8. **Signature of the President**

_____
David M. Dooley

9. **Person to contact during the proposal review**
Name: Jay Sperry

Address: Department of Cell and Molecular Biology
University of Rhode Island
120 Flagg Road
Kingston, RI 02881

Phone: 401-874-5900

Email: jsperry@mail.uri.edu

10. **Signed agreements for any cooperative arrangements made with other institutions/agencies or private companies in support of the program.**
Not applicable.

B. RATIONALE: There should be a demonstrable need for the program.

1. **Explain and quantify the needs addressed by this program, and present evidence that the program fulfills these needs.**
Biomedical, pharmaceutical and biotechnology industries have become major drivers of economic development in New England and across the country. This economic trend demands a workforce well trained in molecular biosciences. Biochemistry is at the heart of molecular biosciences and major breakthroughs in biomedicine, pharmaceuticals and biotechnology. Graduates with knowledge and training in biochemistry will feed this economic demand.

The demand for Biochemistry education is clearly demonstrated by success of Biochemistry programs in other institutions in New England and across the country. Of the six state universities in New England, three (University of Massachusetts, University of Vermont and University of Maine) offer biochemistry programs. Each biochemistry program numbers 1-1.5% of their total undergraduate population. Biochemistry is also one of the most demanded degree programs in many national universities, with Bachelor of Science degree in biochemistry counting 2-7% of all degrees offered. For example, Biochemistry degrees granted make up 7.8%, 5.6%, 4.7% and 2.8% of total degrees

granted from Rice University, UC San Diego, Harvard, and UCLA, respectively. URI has an undergraduate population of about 13000. Assuming 1-1.5% ratio, a university of URI's size would attract 130 - 200 total students to a biochemistry track.

The addition of a biochemistry track will bring significant financial benefits to URI. The new Biochemistry track with a conservative projection of 150 students will result in tuition revenue of $2.325M (assuming an average tuition rate of $15,500, based on the current 61% RI residents and 39% non-residents). The revenue is many times greater than the financial investment required for this reorganization.

C. **INSTITUTIONAL ROLE: The program should be clearly related to the published role and mission of the institution and be compatible with other programs and activities of the institution.**

1. **Explain how the program is consistent with the published role and mission of the institution and how it is related to the institution's academic planning.**
This proposal will allow students to select Biochemistry as an undergraduate track in the Cell and Molecular Biology major. This is a major foundation area for the Life Sciences and Health Sciences, which is one of the focus areas in the Academic Plan for URI in enhancing the STEM disciplines.

D. **INTERINSTITUTIONAL CONSIDERATIONS: The program should be consistent with all policies of the Board of Governors pertaining to the coordination and collaboration between public institutions of higher education. (Consult the Board of Governors' *Coordination Plan for Academic Programs in Rhode Island Public Institutions of Higher Education* [www.ribghe.org/publicreg.htm] for guidelines and restrictions regarding the types and levels of programs the institutions are allowed to offer.)**

1. **Estimate the projected impact of program on other public higher education institutions in Rhode Island (e.g. loss of students or revenues), provide a rationale for the assumptions made in the projections, and indicate the manner in which the other public institutions were consulted in developing the projections.**
No public higher education institution in Rhode Island offers a biochemistry program. So adding a biochemistry track to CMB at URI will not directly impact other institutions. The only way this proposal will impact other institutions and programs is that some students may find the biochemistry program we offer to be better suited for their educational interests. In this case the new track will provide a better educational opportunity for those Rhode Islanders. This impact to other Rhode Island public institutions is likely minimal.

URI is the only public institution in Rhode Island that could offer a biochemistry program or track. We contacted each of the New England state university to obtain the information on the scale and success of their biochemistry and related programs. The information clearly points to a high demand for a biochemistry program and a high likelihood for success at URI. The projection is based on the enrollment information from these state universities.

2. **Using the format prescribed by RIOHE, describe provisions for transfer students (into or out of the program) at other Rhode Island public institutions of higher education. Describe any transfer agreements with independent institutions. The institution must also either submit a Joint Admissions Agreement transition plan or the reason(s) the new program is not transferable. (See *Procedure for Strengthening the Articulation/Transfer Component of the Review Process for New Programs* which can be found at *www.ribghe.org/publicreg.htm.*)**
The reorganization of the microbiology major into a CMB major does not affect the Joint Admissions Agreement between URI and other Rhode Island institutions (CCRI). The transfer of credits into the CMB major will be identical to that spelled out in the articulation agreement currently in effect with the Microbiology Major (Page 199 of 2007-2008 Transfer Guide for Students, http://www.ribghe.org/transfer08.htm).

3. **Describe any cooperative arrangements with institutions offering similar programs. (Signed copies of any agreements pertaining to use of faculty, library, equipment, and facilities should be attached.)**
No other public institution in Rhode Island offers a similar program in biochemistry.

4. **If external affiliations are required, identify providing agencies. (Indicate the status of any arrangements made and append letters of agreement, if appropriate.)**
Not Applicable.

5. **Indicate whether the program will be available to students under the New England Board of Higher Education's (NEBHE) Regional Student Program (RSP).**
No.

E. **PROGRAM: The program should meet a recognized educational need and be delivered in an appropriate mode.**

1. **Prepare a typical curriculum display for one program cycle for each sub-major, specialty or option, including the following information:**

   a. **Name of courses, departments, and catalog numbers and brief descriptions for new courses, preferably as these will appear in the catalog. In keeping with each institution's timetable for completion of student outcomes assessment, each institution should provide an assessment plan detailing what a student should know and be able to do at of the program and how the skills and knowledge will be assessed. For example, if a department brings forth a new program proposal but that department is not slated to have its student outcomes assessment completed until 2008, the program could be approved but with the provision that the department return no later than 2008 and present to the Academic and Student Affairs Committee its student outcomes for that particular program.**

   Although the reorganized CMB major would have three tracks (Microbiology, Biotechnology and Biochemistry), the curricula for the Microbiology and Biotechnology tracks are unchanged. The following is a curricular plan for the newly added Biochemistry track.

Year one-first semester

BIO101	Principles of Biology I	4 cr
CHM101	General Chemistry I	3 cr
CHM102	General Chemistry Lab,	1 cr
MTH111/131/141	Math or Calculus I	3/4 cr

Year one-second semester

CHM112	General Chemistry II	3 cr
CHM114	General Chemistry Lab,	1 cr
MTH132/142	Calculus II	3/4 cr
BIO102	Principles of Biology II	4 cr

Year two-first semester

MIC211	Intro Microbiology	4 cr
CHM227	Organic Chemistry I	3 cr
PHY111/203	General Physics I	3 cr
PHY185/273	General Physics Lab	1 cr

Year two-second semester

BCH311	Intro Biochemistry	3 cr
PHY112/204	General Physics II	3 cr
PHY186/274	General Physics Lab	1 cr
CHM228	Organic Chemistry II	3 cr
CHM226	Organic Chem Lab	2 cr

Year three-first semester

BCH352	General Genetics	4 cr
MIC333	Immunology and Serology	3 cr
XXXYYY	Electives	X cr

Year three-second semester

BCH341	Principles of Cell Biology	3 cr
BCH312	Biochem Lab	2 cr
BCH421	Physical Biochemistry	3 cr

Year four-first semester

BCH482	Proteins and Enzymes	3 cr
BCH412	Adv Biochem lab	2 cr
BCH495	Biochemistry Seminar	1 cr

Year four-second semester

BCH437	Fundamentals of Mol. Biol.	3 cr
BCHXXX*	Elective Biochem courses*	3 cr
BCH492	Research in Biochem	3 cr

* Elective courses chosen from the following can be taken in second, third and/or fourth year:

BIO242	Introductory Human Physiology (strongly recommended for Pre-Med)
BCH435	Introduction to Biology and Genetics of Cancer
MIC413	Advanced Microbiology I
MIC414	Advanced Microbiology II
PHY430	Modern Biological Physics
MIC450	Practical Tools for Sequence Analysis
BPS535	Pharmaceutical Biotechnology
BCH522	Bioinformatics
BIO445	Endocrinology

Others may be added to this list

This biochemistry curriculum takes advantage of existing courses at URI and adds one new course, BCH481 Proteins and Enzymes. This new course helps meet the curricular recommendations for a Biochemistry undergraduate program by the American Society of Biochemistry and Molecular Biology.

b. Required courses in area of specialization and options, if any.

The required courses in the area of specialization (biochemistry) are:

BCH311	Intro Biochemistry	3 cr
BCH312	Biochem Lab	2 cr
BCH341	Principles of Cell Biology	3 cr
BCH412	Adv Biochem lab	2 cr
BCH421	Physical Biochemistry	3 cr
BCH437	Fundamentals of Mol. Biol.	3 cr
BCH482	Proteins and Enzymes	3 cr
BCH495	Biochemistry Seminar	1 cr
BCH492	Research in Biochem	3 cr

The following are optional courses related to the specialty area:

BCH435	Introduction to Biology and Genetics of Cancer
MIC413	Advanced Microbiology I
MIC414	Advanced Microbiology II
PHY 430	Modern Biological Physics
MIC450	Practical Tools for Sequence Analysis
BPS535	Pharmaceutical Biotechnology
BCH522	Bioinformatics
BIO445	Endocrinology

c. Course distribution requirements, if any, within program, and general education requirements.

The course distribution requirements and the general education requirements are listed in the CMB major Biochemistry track check sheet at the end of this form.

d. **Total number of free electives available after specialization and general education requirements are satisfied.**

18.

e. **Total number of credits required for completion of program or for graduation. Present evidence that the program is of appropriate length as illustrated by conformity with appropriate accrediting agency standards, applicable industry standards, or other credible measure, and comparability of lengths with similar programs in the state or region.**

120. This number of credits is consistent with the credit requirements at URI and other institutions.

f. **Identify any courses that will be delivered or received by way of distance learning. (Refer to *www.ribghe.org/publicreg.htm* for the *Standards for Distance Learning in the Rhode Island System of Public Higher Education.*)**
None.

2. **Describe certification/licensing requirements, if any, for program graduates and the degree to which completion of the required course work meets said requirements. Indicate the agencies and timetables for graduates to meet those requirements.**

None.

3. **Include the learning goals (what students are expected to gain, achieve, know, or demonstrate by completion of the program) and requirements for each program.**

We expect that the students will achieve the learning outcomes that are grouped into the following four categories:

a. Discipline-specific knowledge and understanding
   1. Know the structure and function of various biological molecules and cellular structures.
   2. Know the chemical basis of various important biological processes.
   3. Gain an understanding of the fundamentals of chemistry and biology and the key principles of biochemistry and molecular biology.
   4. Gain an understanding of the molecular basis of various diseases, medicine and biotechnology.
   5. Know of the major issues and questions addressed in biochemistry.

b. Ability to gather, synthesize and communicate biochemical information
   6. Show ability to use computers and library as sources of information and research tools.
   7. Demonstrate the ability to assess primary papers critically and communicate biochemical findings in writing appropriate for the biochemistry field.
   8. Be able to orally communicate on a variety of biochemical topics, including experimental results in discipline-appropriate format, such as powerpoint and graphics.

c. Develop technical and problem-solving competence
   9. Demonstrate good quantitative skills such as the ability to accurately and reproducibly prepare reagents for experiments, and perform biochemical experiments.
   10. Gain the ability to design experiments and understand the limitations of the experimental approaches.
   11. Demonstrate the ability to interpret experimental data and identify consistent and inconsistent components.
   12. Perform safe and effective laboratory practice in performing experiments.
   13. Ability to collaborate with other researchers.
   14. Ability to think in an integrated manner and look at problems from different perspectives.
   15. Demonstrate ability to propose hypothesis to explain biochemical observations and experimental approaches to test hypothesis.

d. Personal growth
   16. Demonstrate awareness of ethical dimensions and societal impact of biochemical science.
   17. Develop understanding of the contribution to biochemical science to various professional fields, such as education, medicine, pharmaceuticals, biotechnology, law, etc.
   18. Develop career development goals and personal strategies to achieve goals.

4. Demonstrate that student learning is assessed based on clear statements of learning outcomes and expectations.

The achievement of the above learning goals will be assessed at three levels. **First**, the individual goals will be embedded in the individual courses, and grades from these courses will provide a rough idea of how well the students are achieving these goals. The curricular map below shows the detailed breakdown of which courses teach each of the learning goals. Note that each of the learning goals are taught in multiple courses. **Second**, we will ask the instructors to assess if these learning goals relevant to a course are achieved. This will involve more than an examination of the grade, but a look at which goal is assessed by what type of question in the exams, quizzes, reports, term papers and seminars. Such information will provide a more comprehensive assessment which of the learning goals are achieved. **Third**, we will also employ a survey of the students to determine from their perspective if these individual goals are achieved. A detailed survey questionnaire has been used in the current Microbiology Major for this purpose and a questionnaire with slight modifications (from microbiology-specific to biochemistry specific items) will be used.

The following is a curricular map for the Biochemistry track.

Goal No.	Required courses in biochemistry								
	311	312	341	412	421	437	482	492	495
1	x		x			x	x	x	x
2	x		x		x	x	x	x	x
3	x		x		x	x	x	x	x
4	x		x		x	x	x	x	x
5	x		x			x	x	x	x
6		x		x			x	x	x
7		x		x			x	x	x
8		x		x	x			x	x
9		x		x				x	
10		x		x	x			x	
11		x		x				x	
12		x		x				x	
13		x		x				x	
14		x		x			x	x	x
15		x	x	x	x	x	x	x	x
16	x		x			x	x	x	x
17	x		x			x	x	x	x
18							x	x	x

F. **FACULTY AND STAFF: The faculty and support staff for the program should be sufficient in number and demonstrate the knowledge, skills, and other attributes necessary to the success of the program.**

1. **Describe the faculty who will be assigned to the program. Indicate total full-time equivalent (FTE) positions required for the program, the proportion of program faculty who will be in tenure-track positions, and whether faculty positions will be new positions or reassignment of existing positions.**
Currently the department has four biochemistry faculty members: Professors Joel Chandlee and Gongqin Sun, Associate Professor Lenore Martin and Assistant Professor Niall Howlett. As a group, they have been active in conducting funded research and teaching Biochemistry courses at the graduate and undergraduate levels. They teach many of the courses required for the biochemistry track. Two major required courses, BCH341 and BCH437, are offered by Professor Joanna Norris in the Department of Biological Sciences at URI. The curriculum for the biochemistry track was developed in close consultation with Professor Norris and the Department of Biological Sciences. The only new required course, BCH482 (Proteins and Enzymes) will be offered by Professor Gongqin Sun, whose expertise in this area is demonstrated by numerous research grants

and dozens of publications on proteins and enzymes. Thus, no addition of new faculty is required to initiate the program.

Once the program is up and running, if we reach the projected number of enrollment, we will need one additional faculty member to share the teaching load and add other expertise to the department of Cell and Molecular Biology. We have a glaring weakness in the area of metabolic biochemistry that weakens the educational quality of the biochemistry track. Metabolism of biological molecules for the purpose of energy production, signal transduction or degradation of unwanted molecules is central to all biological processes. Furthermore, metabolic diseases, including heart disease, diabetes, and obesity are the major source of mortality in the US. Despite the clear importance of metabolic biochemistry, the College and University lack a faculty member with expertise in molecular biochemistry of metabolism. Addition of such a faculty member will fill this gap in our research capability and the curriculum for the biochemistry track and makes the teaching load more manageable. We envision that an advanced course in the area of metabolic biochemistry will become a core course in the biochemistry curriculum. We consider this faculty hire an essential element for the long-term success of the new Biochemistry track.

If the enrollment reaches the projection, an additional faculty member may be needed in the chemistry department to alleviate the additional demand for chemistry instruction and laboratory.

G. **STUDENTS: The program should be designed to provide students with a course of study that will contribute to their intellectual, social and economic well-being. Students selected should have the necessary potential and commitment to complete the program successfully.**

1. **Describe the potential students for the program and the primary source of students. Indicate the extent to which the program will attract new students or will draw students from existing programs and provide a specific rationale for these assumptions. For graduate programs, indicate which undergraduate programs would be a potential source of students.**
   The CMB major (including the biochemistry track) will attract high school graduates with career interest in academic research and education, pharmaceutical research and development, medicine and biotechnology. The in-state versus our-of-state ratio will likely be similar to that for the URI general undergraduate population (63:37). If we did not offer this program, some of the students would have pursued a biochemistry education in other state universities in New England, others would likely pursue education in alternative, although less than ideal, fields. For these students, the biochemistry education would offer the shortest and most direct pathway to their career choices. Thus the new track will likely attract a fair number of students who are currently enrolled in the Department of Biological Sciences but with a more specific interest in cell and molecular biology. It will likely attract new students who may be otherwise going to institutions outside of Rhode Island.

L. **EVALUATION: Appropriate criteria for evaluating the success of a program should be development and used.**

1. **List the performance measures by which the institution plans to evaluate the program. Indicate the frequency of measurement and the personnel responsible for performance measurements. Describe provisions made for external evaluation, as appropriate.**

   There are four criteria that will ultimately measure the success of the biochemistry track: enrollment, achievement of learning goals, graduation rate, and success of the graduates in the economic market place. 1) Enrollment. It would likely take 2 to 5 years of ramp-up time before we can judge if the program is successful in attracting students into it. Thus, fifth anniversary of the program's initiation would be a time to evaluate its enrollment success. 2) Achievement of learning goals. Based on the learning goals and the assessment mechanisms outlined in E3 and E4, we should be able to have an evaluation of the program in achieving its learning goals when the students are going through these courses. Assuming the program starts in 2012, the first class of students will have gone through the required courses in 2016, which would be a good time to assess the success of the program in this aspect. 3) Graduation rate. Universities often use four-year and six-year graduate rates to measure the success of a program in graduating the students. The same criterion should apply to the biochemistry track. 4) Success of the graduates from this track in the economic market place. This will be the ultimate measure of the program's success. We plan to track the career and employment of our graduates one year and five years after their graduation. Such information would provide a measure how well we attract and educate students in this track.

   Due to the ramp-up time required for a program to reach its potential, three of the four measures of evaluation can be done 4 years after the initiation of the program, at 2016. After that we plan to perform such evaluations every two years. The chairman of the Department of Cell and Molecular Biology, currently Dr. Jay Sperry, will be responsible for organizing and leading this evaluation, performed by relevant faculty members.

CMB MAJOR, BIOCHEMISTRY TRACK, 120 CREDITS

College of the Environment & Life Sciences (CELS)

Department of Cell & Molecular Biology

STUDENT_____ **ADVISOR**_____

General Education (28 credits +11 Basic Sciences)
URI 101_____(1)

C: COM 100_____(3), **CW**: WRT _____(3)

MQ: (3 cr. from Basic Science Requirements)

N: (8 cr. from Basic Science Requirements)

S: _____(3) _____(3)

(15 credits from L, A, and F)
L: _____ _____

A: _____ _____

F: _____ _____

Introductory Professional Courses (3 credits)
BCH 311 _____(3)

.

Basic Sciences (45 credits)
MIC 211_____(4)

BIO 101_____(4)

BIO102_____(4)

BIO 352_____(3)

CHM 101_____(3), 102_____(1)

CHM 112_____(3), 114_____(1)

CHM 226_____(2), 227_____(3), 228_____(3)

MTH 111____(3), *or* 132_____(3), *or* 142_____(3)
or STA 307/8 ____(3)

MTH 131_____(3) *or* MTH 141_____(3)

PHY 111_____(3), 185_____(1)

PHY 112_____(3), 186_____(1)

8 credits of basic sciences apply to N category & 3 credits apply to MQ for General Ed credits.

Concentration (27 credits)
BCH 437 _____(3) BCH 341 _____(3)

BCH 421_____(3) BCH 412_____(2)

BCH 482 _____(3) MIC 333_____(3)

Select from the following courses to fulfill the reminder 10 credits needed.
BCH 190_____(3) MIC334_____(3)

MIC 413_____(3) MIC 415_____(2)

BCH 435_____(3) BPS 535_____(3)

BCH 522_____(3) PHY 430_____(3)

BIO 445_____(3) MIC 450_____(3)

BCH 491/492 ___ (up to 6 credits)

Free Electives (17 credits)
Students may take courses of their choice.

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

120 credits required

Student Total_____

ADVISING COMMENTS:

THE
UNIVERSITY
OF RHODE ISLAND
COLLEGE OF
THE ENVIRONMENT
AND LIFE SCIENCES

THINK BIG WE DO™

DEPARTMENT OF BIOLOGICAL SCIENCES
Center for Biotechnology and Life Sciences (Main Office)
120 Flagg Road, Kingston, RI 02881 USA
p: 401.874.2373
f: 401.874.9750

MEMORANDUM

TO: Jay Sperry, Chair, Cell and Molecular Biology

FROM: Marian R. Goldsmith, Chair, Biological Sciences

SUBJECT: Proposal to add Biochemistry Track to the CMB Major

DATE: November 3, 2011

cc: G. Sun, A. Veeger, J. Kirby, C. English

On behalf of the Biological Sciences Department, I am writing in strong support of the Cell and Molecular Biology (CMB) Department's proposal to add a Biochemistry track to their undergraduate major programs. As indicated in the proposal, there is a strong need to make this curriculum available to URI students, and CMB is well-positioned to offer this track in the major. The new track's curriculum is clearly distinguished from majors offered by Biological Sciences (B.S. Biological Sciences, B.S. Marine Biology, and B.A. Biology), posing no significant overlap in aims and goals of our programs. Further, a Biological Sciences faculty member who currently offers two of the courses (BCH/BIO 341 Cell Biology and BCH/BIO 437) included in the Biochemistry track curriculum was consulted during the development of the proposal, and I do not anticipate any immediate change in her teaching assignment for the foreseeable future.

PROGRAM: **Animal Science and Technology** **Student**_____

OPTION: **Pre-Veterinary** **Advisor**_____

General Education (36)_____

C: COM 100_____(3), CW:WRT_____(3)

S: ECN_____, _____(6)

L: _____, _____(6)

A: _____, _____(6)

F: _____, _____(6)

(15 credits from L, A, and F)

N: (6) (requirement met by BIO 101, BIO 102)

M: (3) (requirement met by MTH 131)

Intro. Prof. Courses (5)_____

AVS 101 (3)_____, AVS 102 (1)_____

AVS 110 (1)_____

Basic Sciences (48)

Required:

BIO 101 (4) _____, BIO 102 (4)_____

BIO 352 (3)_____

BCH 311 (3)_____,

CHM 101 (3) _____, CHM 102 (1)_____

CHM 112 (3)_____, CHM 114 (1)_____

CHM 226 (2)_____, CHM 227 (3)_____, CHM 228 (3)_____

MIC 201 (4)_____, or MIC 211 (4)_____

MTH 131 (3)_____

PHY 111 (3)_____, PHY 185 (1)_____

PHY 112 (3)_____, PHY 186 (1)_____

STA 307 (3)_____, or STA 308 (3)_____, or STA 409 (3)_____

Concentration* (26)_____

AVS 331/3_____(4) AVS 472/3_____(4)

AVS 323_____(3) BIO 341_____ (3)

AVS 324_____(3) BIO 437_____ (3)

AVS 412_____(3) _____ (3)

Supporting Electives (8)_____

AVS 212_____(3) _____( )

AVS 104_____(2)

Free Electives (6)_____

_____( ) _____( )

_____( ) _____( )

Note: Since veterinary schools require two writing courses, taking WRT 333 as a free elective is highly recommended

****120 credits required**

Student Total _____

***Six classes must be in AVS. ****Maximum of 9 credits in AVS 399, 491, 492 and RDE 486.**

ADVISING COMMENTS:

PROGRAM: **Animal Science and Technology** **Student**_____

OPTION: **Animal Management** **Advisor**_____

General Education (36) _____

C: COM 100____(3), CW: WRT_____(3)

M: _____(3)

S: _____, _____(6)

L: _____, _____(6)

A: _____, _____(6)

F: _____, _____(6)

(15 credits from L, A, and F)

N: (6) (requirement met by BIO 101 and CHM 101 or CHM 103)

Intro. Prof. Courses (5) _____

AVS 101 (3)_____, AVS 102 (1)_____

AVS 110 (1)_____,

Basic Sciences (19)_____

Required:

BIO 101 (4)_____

CHM 101 (3)_____, or CHM 103 (3)_____

CHM 102 (1)_____, or CHM 105 (1)_____

CHM 112 (3)_____, or CHM 124 (3)_____

CHM 114 (1)_____, or CHM 126 (1)_____

Additional basic science credits from approved list.

_____(3,4) _____(3,4)

Concentration* (25) _____

AVS 323____(3) AVS 343____(3)

AVS 324____(3) _____(3)

AVS 325____(3) _____(3)

AVS 331/3____(4) _____(3)

Supporting Electives (35)____

AVS 132____(3) _____( )

AVS 201____(3) _____( )

AVS 212____(3) _____( )

AVS 104____(2) _____( )

_____( ) _____( )

_____( ) _____( )

Free Electives (6) _____

_____( ) _____( )

_____( ) _____( )

****120 credits required**

Student Total_____

***Six classes must be in AVS. ****Maximum of 9 credits in AVS 399, 491, 492 and RDE 486.**

ADVISING COMMENTS:

REVISED 6/10

PROGRAM: **Animal Science and Technology**

OPTION: **Animal Science**

Student_____

Advisor_____

General Education (36) _____

C: COM 100___(3), CW:WRT_____(3)

S: _____(3)_____(3)

L: _____, _____(6)

A: _____, _____(6)

F: _____(3)_____(3)

(15 credits from L, A, and F)

N: (6) (requirement met by BIO 101, BIO 102)

M: (3) (requirement met by MTH 131)

Intro. Prof. Courses (5) _____

AVS 101 (3)_____, AVS 102 (1)_____

AVS 110 (1)_____,

Basic Sciences (30-35)_____

Required:

AVS 420 (3)_____or BIO 352 (3)_____

BIO 101 (4)_____, BIO 102 (4)_____

CHM 101 (3)_____, CHM 102 (1)_____

CHM 112 (3)_____ CHM 114 (1)_____

CHM 124, 126 (3, 1) _____, or

CHM 226, 227, 228 (2,3,3) _____

MTH 131 (3) _____

MIC 201 (4)_____, or MIC 211 (4)_____

STA 307 (3)_____, or STA 308 (3)_____

Concentration* (25) _____

AVS 323_____ (3) AVS 472_____(3)

AVS 324_____(3) _____(3)

AVS 331/3_____(4) _____(3)

AVS 412_____(3) _____(3)

Supporting Electives (22-27)_____

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

_____( ) _____( )

Free Electives (6) _____

_____( ) _____( )

_____( ) _____( )

****120 credits required**

Student Total_____

***Six classes must be in AVS. **Maximum of 9 credits in AVS 399, 491, 492 and RDE 486.**

ADVISING COMMENTS:

Supporting Electives:
Any course taught in CELS or The College of Business, or with the prefix:
MTH (Math)
STA (Statistics)
APG (Anthropology)
CSC (Computer Science)
CHM (Chemistry)

Concentration (300 level or above)
Six classes must be in AVS

List of AVS courses for all options:

AVS 101 Introduction to Animal Science
AVS 102 Introduction to Animal Science Lab
AVS 110 Freshman Seminar in AVS
AVS 132 Animal Agriculture, Food Policy, and Society
AVS 201 Companion Animal Management
AVS 212 Feeds and Feeding
AVS 301302 Junior/Senior Seminar in AVS
AVS 104 Animal Management Techniques
AVS 323 Animal Management I (Ruminants)
AVS 324 Animal Management II (Monogastrics)
AVS 325 Animal Management III (Exotics)
AVS 331/333 Anatomy & Physiology (Lect. & Lab)
AVS 332 Animal Diseases
AVS 340 Veterinary Pharmacology
AVS 343 Behavior of Domestic Animals
AVS 372 Introductory Endocrinology
AVS 390 Wildlife and Human Disease
AVS 399 (RDE 486) Internship in AVS
AVS 412 Animal Nutrition
AVS 420 Animal Genetics and Breeding
AVS 440 Seminar on Marine Mammals
AVS 462 Laboratory Animal Techniques
AVS 472/473 Physiology of Reproduction (Lect. & Lab)
AVS 491/492 Special Projects

List of courses for AVS options:

Pre Vet/Graduate/Animal Science
BIO 101 Principles of Biology I
BIO 102 Principles of Biology II
BIO 341 Principles of Cell Biology
BIO 352 General Genetics
BIO 437 Fund. of Molecular Bio
BCH 311 Introd. Biochemistry
CHM 101 General Chemistry I
CHM 102 Gen. Chem. Lab I
CHM 112 General Chemistry II
CHM 114 Gen. Chem. Lab II
CHM 226 Oraganic Chem Lab
CHM 227 Organic Chemistry I
CHM 228 Organic Chemistry II
ECN 100 Intro to Economics
MIC 201 Intro Medical Micro or
MIC 211 Introd. Mircrobiology
MTH 131 Calculus I
PHY 111 General Physics I
PHY 112 General Physics II
PHY 185 General Physics Lab I
PHY 186 General Physics Lab II
STA 307 Introd. Biostatistics or
STA 308 Introductory Statistics or
STA 409 Stat. Meth. in Research
WRT 333 Scientific Writing

Animal Management
CHM 103 Introductory Chemistry
CHM 105 Introductory Chem Lab
CHM 124 Intro. To Organic Chem
CHM 126 Intro to Org. Chem Lab